

D.Voc. (Horticulture)

3 Year Program

NSQF LEVEL-4.5

For Academic Session 2023-24

Skill Faculty of Agriculture



Shri Vishwakarma Skill University

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**SCHEME
D. Voc. (Horticulture)**

SEMESTER-I															
Category	Subject Code	Subjects	Credits			Hours			Marks						Total
									Theory			Practical			
			Th	P	To	Th	P	To	I	E	To	I	E	To	
General Education Component	23/D/HRT/01	Language (English)	1	0	1	30	0	30	15	35	50				100
	23/D/HRT/02	Language (English)-Lab		1	1	0	30	30				35	15	50	
	23/D/HRT/03	Fundamental of computer	1	0	1	30	0	30	15	35	50				
	23/D/HRT/04	Fundamental of computers Lab	0	1	1	0	30	30				35	15	50	
	GEC Total		2	2	4	60	60	120							
Skill Education Component	23/D/HRT/05	Science and Technology-I	3	0	3	90	0	90	15	35	50				100
	23/D/HRT/06	Science and Technology-I Lab	0	3	3	0	90	90				35	15	50	
	23/D/HRT/07	Basic Horticulture	2	0	2	60	00	60	15	35	50				100
	23/D/HRT/08	Basic Horticulture Lab	0	2	2	0	60	60				35	15	50	
	23/D/HRT/09	Fundamentals of Soil Science	3	0	3	90	0	90	15	35	50				100
	23/D/HRT/10	Fundamentals of Soil Science Lab	0	3	3	0	90	90				35	15	50	
		Total	10	10	20	300	300	600							

SEMESTER-II

Category	Subject Code	Subjects	Credits			Hours			Marks						Total
			Th	P	T o	Th	P	To	Theory			Practical			
									I	E	T	I	E	To	
General Education Component	23/D/HRT/11	Value Education and Professional Ethics	1	0	1	30	0	30	15	35	50	35	15	50	100
	23/D/HRT/12	Environmental Studies	1	0	1	30	0	30	15	35	50	35	15	50	100
	GEC Total		2	0	2	60	0	60							
Skill Education Component	23/D/HRT/13	Science and Technology-II	3	0	3	90	0	90	15	35	50				100
	23/D/HRT/14	Science and Technology-II Lab	0	3	3	0	90	90				35	15	50	
		23/D/HRT/15	Plant Propagation and Nursery Management	2	0	2	60	00	60	15	35	50			
	23/D/HRT/16	Plant Propagation and Nursery Management Lab	0	4	4	0	120	120				35	15	50	
	23/D/HRT/17	Production technology of Vegetable crops	2	0	2	60	00	60	15	35	50				100
	23/D/HRT/18	Production technology of Vegetable crops Lab	0	4	4	0	120	120				35	15	50	
		Total	9	11	20	270	330	600							

SEMESTER-III

Category	SubjectCode	Subjects	Credits			Hours			Marks						Total
			Th	P	To	Th	P	To	Theory			Practical			
									I	E	T	I	E	To	
General Education Component	23/D/HRT/19	Personality development and Career	1	0	1	30	0	30	15	35	50	35	15	50	100
	23/D/HRT/20	Industrial Ethics and value	1	0	1	30	0	30	15	35	50	35	15	50	100
	GEC Total		2	0	2	60	0	60							
	23/D/HRT/21	Production Technology of Flower crops	2	0	2	60	00	60	15	35	50				100
	23/D/HRT/22	Production Technology of Flower crops Lab	0	4	4	0	120	120				35	15	50	
	23/D/HRT/23	Production Technology of Fruit Crops	2	0	2	60	00	60	15	35	50				100
	23/D/HRT/24	Production Technology of Fruit Crops Lab	0	4	4	0	120	120				35	15	50	
	23/D/HRT/25	Pest Management of Horticultural Crops and Apiculture	2	0	2	60	00	60	15	35	50				100
	23/D/HRT/26	Pest Management of Horticultural Crops and Apiculture Lab	0	4	4	0	120	120				35	15	50	
		Total	8	12	20	240	360	600							

SEMESTER-V

Category	Subject Code	Subjects	Credits			Hours			Marks						Total
			Th	P	To	Th	P	To	Theory			Practical			
									I	E	To	I	E	To	
Skill Component	23/D/HRT/35	<u>OJT</u> Nursery production and management/ Floriculture and Landscaping gardening/ Project writing/viva voice	0	20	20	0	600	600				350	150	500	500
		Total	0	20	20	00	540	600							

SEMESTER-VI

Category	Subject Code	Subjects	Credits			Hours			Marks						Total
			Th	P	To	Th	P	To	Theory			Practical			
									I	E	To	I	E	To	
Skill Component	23/D/HRT/36	OJT Protective cultivation of high value crops/ Post harvest technology and value addition /Project writing/viva voice	0	20	20	0	600	600				350	150	500	500
		Total	0	20	20	00	600	600							

Complete Syllabus (Semester-1)

Language (English)

COURSE CODE: 23/D/HRT/01

CREDIT-1

Course Objectives:

CO 1: To inculcate in students professional and ethical attitude, effective communication skills, teamwork, skills, multidisciplinary approach and an ability to understand engineer's social responsibilities.

CO 2: To inculcate in students written communication skills

Course Learning Outcomes:

CLO 1: Able to differentiate in the vowels and consonants that can help the students to pronounce words better and be able to learn phonetics.

CLO 2: Learn the correct pronunciation of the words helping in the reduction of Mother Tongue Influence. Able to communicate effectively and will have improved verbal communication.

CLO 3: Learn to frame the sentences properly with the correct formation. This will improve the written skills of the students.

CLO 4: Able to write paragraphs on different topics with the correct usage of vocabulary and will improve the written as well as verbal communication.

CLO 5: Learn the correct usage of the punctuation marks, will draft formal & informal emails and will comprehend the article.

Syllabus

Unit-1: Communication

Meaning of Communication, Importance of Communication, Types of Communication, Process of Communication, Communication network in an organization, Barriers to Communication, Essentials of good Communication.

Unit-II: Grammar and Usage

Subject and verb agreement, Tenses: simple past (negatives/interrogatives) present perfect, past perfect continuous, past perfect, expressing future time (will and going to), Passive voice (perfect tenses and modals), Modals (must, should ought to, would).

Unit-III: Reading Skills, Listening Skills and Writing Skills

Prose texts: The Gift of the Magi by O. Henry • Poems: 1. Death the Leveller by James Shirely.

The process of listening, Types of listening, Benefits of effective listening, Barriers to listening

Paragraph Writing: (Describing objects, describing people, Narrating events, stories). Letter Writing:

Application for leave Application for jobs, asking for information from various agencies.

Suggested Readings:

- Kour, B. (2009) *Effectual communication skills*. New Delhi: S.K Kataria & Sons.
- Bansal, R.K. and Harrison, J.B. (1983) *Spoken English for India: A manual of speech and phonetics*. Madras India: Orient Longman.
- Hornby, A.S. et al. (2007) *Oxford Advanced Learner's Dictionary of current English*. Oxford: Oxford University Press.
- McCarthy, M. and O'Dell, F. (2017) *English vocabulary in use*. Cambridge: Cambridge University Press. Shenai, M. (2011) *English grammar and composition*. Delhi: Pacific Books International.

Language (English) LAB

COURSE CODE: 23/D/HRT/02

CREDIT-1

Course Objectives: Develop effective communication skills among the students for the business world

Course Learning Outcomes:

CLO 1: Able to differentiate in the vowels and consonants that can help the students to pronounce words better and be able to learn phonetics.

CLO 1: Learn the correct pronunciation of the words helping in the reduction of Mother Tongue Influence. Able to communicate effectively and will have improved verbal communication.

CLO 1: Learn to frame the sentences properly with the correct formation. This will improve the written skills of the students.

CLO 1: Able to write paragraphs on different topics with the correct usage of vocabulary and will improve the written as well as verbal communication

List of Practicals:

1. Greetings and starting a conversation.
2. Non Verbal Communication Techniques during conversation.
3. Verbal Communication Techniques during Conversation.
4. PPT presentation.
5. Debate.
6. Situational dialogues / Role play.
7. Telephonic skills.
8. Group Discussions

Suggested Readings:

- Sethi, J & *et al.* A Practice Course in English Pronunciation, Prentice Hall of India, New Delhi.
- Sen, Leena. Communication Skills, Prentice Hall of India, New Delhi.
- Prasad, P. Communication Skills, S.K. Kataria & Sons.
- Bansal, R.K. and J.B. Harrison. Spoken English, Orient Language

FUNDAMENTAL OF COMPUTERS

COURSE CODE: 23/D/HRT/03

CREDIT: 1

Course Objectives: Course is designed to impart knowledge and skills required to learn fundamentals of computers

Course Learning Outcomes:

CLO 1: To understand basics of computer and working with Operating System.

CLO 2: To know the concept of input and *output* devices

CLO 3: To develop working skills with MS Office

CLO 4: Enable to access internet technology.

Theory

UNIT-1

Introduction to Computer System: What is computer, basic applications of computer, data vs information, various parts of computer - input devices, output devices, CPU, memory unit, types of computer memory, concepts of hardware and software, computer virus: definition, characteristics of viruses, anti-virus.

UNIT-II

Number System: Introduction to number system, radix of each number system, decimal to binary and vice versa, decimal to octal and vice versa, decimal to hexa-decimal and vice versa.

UNIT-III

Operating System: Overview of operating system, definition, functions of operating system, need and its services, examples and types of operating system-batch processing, multiprocessing, time-sharing.

UNIT-IV

Understanding MS Office: Introduction to MS Word - Its features, uses, tabulate data. Introduction to MS Excel- Its features, working with spreadsheets, uses, entering data in tabular format, sorting data. Introduction to MS Power-point - making presentations, adding animations.

UNIT-V

Networking: what is computer Network, Type of computer networks – LAN, MAN, WAN, Introduction to internet, Network Topologies – Bus, Ring, Star, Mesh, Hybrid, search engine and e-mail communication.

FUNDAMENTAL OF COMPUTERS LAB

COURSE CODE: 23/D/HRT/04

CREDIT: 1

Practicals:

1. To understand how to turn on and shut down computer system.
2. Create an E-mail account on Gmail. Compose and send an attachment via email.
3. Learn how to do the research on internet using Web Browser. Now perform research on study various parts of computer. Prepare a report in word that include following- What is computer? What are various parts/component of computer with function of each part.
4. Using MS Word make your resume / Time Table.
5. Using MS Power Point make an animated PowerPoint presentation on any topic of Computers by doing proper research.
6. Input various types of series – same, sequential, days sequence, date, odd, and multiple of 10.
7. Create student personal database using Excel that includes name, roll no, branch, semester, email id, address, phone number.
8. Perform basic functions like sum, average, count etc. on Excel Table.
9. Perform sorting on the data given in Excel.

Recommended reading:

- Patt, Yale and Patel, Sanjay. 2019. Introduction to Computing Systems: From bits and gates to C & beyond. McGraw Hill.
- Elahi, Ata. 2017. Computer Systems, Digital Design, Fundamentals of Computer Architecture and Assembly Language. Springer.
- Norton, Peter. 2017. Introduction to Computers. McGraw Hill Education.
- Maluth, John Monyjok. 2016. Basic Computer Knowledge (Computer Basics Book 1). Zaccheus Entertainment.
- Ravichandran. A. 2014. Fundamentals of Information Technology. Khanna Book Publishing Company.
- Sinha, Priti and Sinha, Pradeep K. 2004. Computer Fundamentals. BPB Publications.

SCIENCE AND TECHNOLOGY-I

COURSE CODE: 23/D/HRT/05

CREDIT: 3

Course Objectives:

The objective of the course is to build the basic understanding of science & technology and then build an interface of theoretical concepts with their practical applications.

Course Learning Outcomes:

By the end of the course, the student will be able to

CLO1: Understand the laws of mechanics and thermodynamics.

CLO2: Apply the acquired knowledge of mechanics and thermodynamics in agriculture.

CLO3: Understand the structural properties of agrochemicals required for hydroponic farming.

CLO4: Acquire Knowledge of concept of plant physiology and respiration in plants for growth of plants in agriculture.

SYLLABUS

Unit I: Principles of Mechanics

Fundamental and derived units, Newton's laws of motion, Newton's laws of gravitation, Kepler's laws of planetary motion, escape velocity, basics of geo-informatics and its application in agriculture.

Unit II: Thermodynamics and it's Applications

Heat, measurement of temperature, scales of temperature measurement, resistance temperature detectors (RTD's), laws of thermodynamics, modes of heat transfer, renewable energy sources such as thermoelectric, photoconductivity and photovoltaic, hydrogen energy, application of renewable energy in agriculture.

Unit 3: Basic concept of Chemistry

Matter, element, compound and mixtures, atoms, molecules, ions, symbols and formulae, Writing chemical formulae of simple chemical compounds, Atomic and molecular masses, mole concept and molar mass, percentage composition, empirical and molecular formula, chemical reactions, stoichiometry and calculations based on stoichiometry, solutions, solubility.

Unit 4: Basic Structural Chemistry

Classification of Hydrocarbons: Aliphatic and aromatic hydrocarbons, alicyclic compounds. Heterocyclic chemistry: Basic idea of chemistry (structure and properties) of furan, thiophene,

pyrrole, indole, pyrazole, imidazole, oxazole, thiazole, pyridine, piperidine, quinoline, isoquinoline, pyran, etc.

Unit 5: Plant Physiology:

Photosynthesis in Higher Plants: Photosynthesis as a means of autotrophic nutrition; site of photosynthesis, pigments involved in photosynthesis (elementary idea); photochemical and biosynthetic phases of photosynthesis; cyclic and non-cyclic photophosphorylation; chemiosmotic hypothesis; photorespiration; C₃ and C₄ pathways; factors affecting photosynthesis; Respiration in Plants: Exchange of gases.

Suggested Reading:

- Merle C. Potter, E. W. Nelson, Charles L. Best, William G. McLean, Schaum's Outline of Engineering Mechanics
- Merle C. Potter, Craig W. Somerton, Schaum's Outline of Thermodynamics for Engineers
- H. C. Verma, Concept of Physics-Volume 1.
- H. C. Verma, Concept of Physics-Volume 2.
- Arthur Beiser, Concept of Modern Physics.
- David Goldberg, Beginning Chemistry (Schaum's Outline)

SCIENCE AND TECHNOLOGY-I Lab

COURSE CODE: 23/D/HRT/06

CREDIT: 3

List of Practicals:

1. To measure length, radius of a given cylinder, a test tube and a beaker using a Vernier calliper and find volume of each object.
2. To determine diameter of a wire, a solid ball and thickness of cardboard using a screw gauge.
3. To determine radius of curvature of a convex and a concave mirror surface using a spherometer.
4. To study conservation of energy of a ball or cylinder rolling down an inclined plane.
5. To determine the atmospheric pressure at a place using Fortin's Barometer.
6. Quantitative Estimation
 - i. Using a mechanical balance/electronic balance.
 - ii. Preparation of standard solution of Oxalic acid.
 - iii. Determination of strength of a given solution of Sodium hydroxide by titrating it against standard solution of Oxalic acid.
 - iv. Preparation of standard solution of Sodium carbonate.
7. Qualitative Analysis : Detection of -Nitrogen, Sulphur, Chlorine in organic compounds.
8. To determine the pH of given samples of i) lemon juice ii) Tomato juice iii) Milk iv) Vinegar
v) Washing Soda vi) Tap water using pH paper
9. Study of distribution of stomata on the upper and lower surfaces of leaves.
10. Comparative study of the rates of transpiration in the upper and lower surfaces of leaves

BASIC HORTICULTURE

COURSE CODE: 23/D/HRT/07

CREDIT-2

Course Objectives:

This program is aimed to provide basic knowledge of horticulture in a brief and prescribed manner to the students.

Course Learning Outcomes:

CLO1: The student will be able to understand different branches of horticulture

CLO2: Can demonstrate advanced technologies like training, pruning, etc in horticulture

SYLLABUS

Unit-1:

Definition of Horticulture. Branches of Horticulture. Importance of horticulture in terms of economy, production, employment. generation, export, environmental protection and human resource development. Scope for horticulture in Haryana and India. Nutritive value of horticultural crops.

Unit-2:

Nursery and its type. Nursery beds and its type. Nursery techniques and their management, soil and climate, vegetable gardens, nutrition and kitchen garden and other types of gardens - principles, planning and layout, management of orchards, planting systems and planting densities. Principles, objectives, types and methods of training and pruning of fruit crops, growth regulators and their uses in horticulture.

Unit 3:

Weed management, fertility management in horticultural crops-manures and fertilizers, different methods of application, cropping systems, intercropping, multi-tier cropping, mulching– objectives, types, merits and demerits. Inflorescence and its type in horticultural crops. Classification of bearing habits of fruit trees, factors influencing the fruitfulness and unfruitfulness in horticultural crops. Rejuvenation of old unproductive orchards, top working, frame working, principles of organic farming, market chain management

Suggested Readings:

- Singh, J. (2014) *Basic horticulture*. Ludhiana: Kalyani Publishers.
- Peter, K.V. (2018) *Basics of horticulture*. New Delhi: New India Publishing Agency.
- Bal, J.S. (2010) *Fruit growing*. Ludhiana: Kalyani Publishers.

BASIC HORTICULTURE LAB

COURSE CODE: 23/D/HRT/08

CREDIT-2

List of Practicals:

1. Identification and uses of garden tools and implements in Horticulture
2. Identify the Horticulture Zones in Map
3. Different types of pots, polythene bags and containers used for seed growing
4. Preparation of potting mixture
5. Potting and Repotting
6. Preparation of Nursery and seed bed
7. Types of different planting systems
8. Layout of orchard, digging of pits and planting
9. Transplanting- Precautions.
10. Study of different Irrigation methods in horticultural crops.
11. Study of different training and pruning methods in horticultural crops
12. Visit to Commercial vegetable, flowers and Fruit orchards

FUNDAMENTALS OF SOIL SCIENCE

COURSE CODE: 23/D/HRT/09

CREDIT- 3

Course Objectives:

CO1: To develop an understanding and knowledge of the basic and applied chemical, physical, and biological concepts in soil.

CO2: To develop an understanding of the origin, classification, and distribution of soils and their relationship to people and food production.

CO3: To develop an understanding of the management and conservation of soils

Course Learning Outcomes:

On completion of this unit learners should:

CLO 1: Be able to investigate soil characteristics

CLO 2: Understand how soil characteristics affect plant growth and development

CLO 3: Understand how soil characteristics affect plant selection.

Unit 1:

Soil - Definition, scope, relation with other sciences. Components - Genesis, formation and classification of rocks and minerals, weathering-types, factors affecting, factors of soil formation. Pedogenic processes, soil profile, soil orders, major soil groups in India.

Unit II:

Physical properties of soil - Colour, texture, structure, bulk density, particle density, pore space; soil water, soil air, soil temperature and their significance in crop production. Soil chemical properties – Soil reaction, EC and CEC, soil colloids, importance of ion exchange. Soil organic matter and its impact on soil properties, soil biota and their role in plant nutrition.

Unit III:

Essential nutrients for crop plants - Major and micro nutrients and their role in crop production. Manures and fertilizers: Types - Straight, complex, compound, mixed, fortified and chelated fertilizers and their reactions in soil - Techniques to enhance fertilizer use efficiently.

Unit IV:

Soil fertility - INM and IPNS – Problem soils – Acid, saline and alkaline soils – Their formation, reclamation and management.

Unit V

Soil water forms and classification, soil moisture constants, energy concepts, PF scale soil moisture measurements, soil water movement –hydraulic conductivity of soil.

Soil pollution, prevention and mitigation

Suggested Readings:

- Ghildyal, B.P. and Tripathi, R.P. (2001) *Soil physics*. New York: Wiley.
- Hillel, D. (2007) *Introduction to environmental soil physics*. Amsterdam: Elsevier Science & Technology.
- Saha, A.K. (2022) *Text book of soil physics*. Ludhiana: Kalyani.

FUNDAMENTALS OF SOIL SCIENCE LAB

COURSE CODE: 23/D/HRT/10

CREDIT-3

List of Practicals:

1. Study of rocks and minerals
2. Collection and processing of representative soil Samples, processing and storage
3. Estimation of pH and EC
4. Determination of BD and Particle density
5. Textural analysis of soil by Feel method
6. Robinson's pipette and hydrometer methods
7. Use of Keen's cup for determination of soil physical properties
8. Description of soil profile and determination of soil colour.
9. Determination of soil temperature
10. Determination of soil moisture by gravimetric method
11. Determination of hydraulic conductivity
12. Aggregate size distribution analysis of soil
13. Determination of CEC